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Trade Openness and Manufacturing Sub-Sector Growth in Nigeria

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Abstract: *The manufacturing sub-sector and trade openness play key roles in economic growth of nations, various government administrations in Nigerian recognize these roles and have made significant efforts (SAP, Trade, Export, Digital Economy and Market access policies. etc.) sub-sector and trade openness in the economic growth of Nigeria remain epileptic except importation. Thus, the study examined trade openness and manufacturing sub-sector in Nigeria between 1981 and 2020. Manufacturing sub-sector and trade openness were proxied by foreign direct investment, trade openness index, Foreign Portfolio Investment, foreign remittances and exchange rate which adopted as check variable and analyzed using both descriptive and econometrics techniques. The results showed that trade openness and manufacturing sub-sector exhibited positive relationship during the period of investigation. However, foreign portfolio investment portrayed subtractive influence on the performance of the manufacturing sub-sector for the period. The study recommends that government of Nigeria should implement the policy of duty draw back/suspension scheme (DDBS) which stipulates the refund of import duties on raw materials including packaging materials used in manufacturing exportable good, subsidize loan and transitory tax exemption to encourage both indigenous and foreign investors to participate more in the manufacturing sub-sector.*

Keywords: manufacturing sub-sector, trade openness, economic growth

INTRODUCTION

The manufacturing sub-sector which is a subset of the industrial sector occupies a central place in the economic growth of any nation. No economy can experience inclusive growth without a potent manufacturing sub-sector. However, the manufacturing sector in Nigeria is a child of misfortune through industrial policies and programmes. The structural adjustment programme (SAP) was one of the programmes aimed at promoting investment in the manufacturing sub-sector, stimulating non-oil exports, provid a base for private sector-led development and promote the efficiency of Nigeria's industrial sector (Oyedele, 2009). According to CBN (2022) “the activities of the manufacturing sub-sector comprises that of the Cement, Food, Beverage and Tobacco, Textile,

Apparel and Footwear, Wood and Wood Products, Pulp, Paper and Paper Product, Chemical and Pharmaceutical, Non-Metallic Products, Plastic and Rubber products, Electrical and Electronics, Basic metal, Iron and Steel, Motor vehicles, and assembly industries". On the part of Adofu et al. (2015) manufacturing involves the production of merchandise for sale or use through the application of tools, machine, labour, chemical, and biological formulation. It also includes handicraft of human activities and high technology through which raw materials are transformed or converted into a finished product on a large scale. On the other hand, trade openness refers to the free movement of goods and services across international borders. According Kerebana and Orlu (2021) "Trade openness involves the dismantling of policies that hinder free trade. These may be in the form of tariff reduction or removal, removal of export and import quarter system". A country that has a well-developed manufacturing sub-sector will not only produce what its citizens need but for export to other nations through international trade and earn foreign exchange to develop other sector of the economy.

However, in spite of these pivotal roles of the manufacturing sector to national development the history of the manufacturing and industrial sub-sector still mirrors a subsector that has been neglected through policy inconsistencies. Consequently, manufacturers in Nigeria heavily relied on the importation of machinery and other equipment to sustain some level of industrial production. A situation that has exposed the manufacturing sub-sector in Nigeria to unfavourable foreign exchange rate resulting in the poor state of the sub-sector. Therefore, the study examines trade openness and manufacturing sub-sector in Nigeria from 1981 to 2020. The remaining part of the research is arranged thus: section two looks at the theoretical review, section three takes care of the empirical review, section four talks about methodology of study while section five concentrates on the conclusion and policy recommendations.

THEORETICAL REVIEW

This study is anchored on the new growth theory propounded by a number of scholars among them are the likes of Kenneth, Paul and Lucas etc. The theory is an extension of the neoclassical theory by Solow-Swan growth model. The new growth theory included endogenous technical progress in the neoclassical growth model proposed by Solow-Swan. The theory simply states that economic growth emanates from endogenous factors and not from the forces of exogenous factors as proposed by the neoclassical endogenous growth theory. This means that technical progress is a function of the rate of investment, size of the capital stock and stock of human capital. Some major proponents and opponents of the theory and their respective views are discussed below:

Grossman and Helpman (1991) demonstrated the effectiveness of the theory and came up with the conclusion that developing countries can benefit from trading with developed countries by tapping into their knowledge, technologies and development which have the potentials of growing the rate of accumulation of human and physical capital which can subsequently lead to economic growth. They specifically argued that new knowledge and discoveries which are cardinal for economic

growth are gained when people in the small society communicate with agents in the world outside through trade.

On the contrary, Scott and Auerbach argued that, there is nothing new about the theory because the ideas that they claimed to be new were already discussed by Adam Smith and Marx. Srinivasan who opined that, the concept of increasing returns and endogeneity are traceable to neoclassical and Kaldor's model while Olson was dissatisfied with the fact that the new growth theory attaches great emphasis on the functions of human capital instead of the role of the institution.

Haven extensively gone through the assumptions, proponents and the antagonists of the new growth theory the study has enough justification to anchored this investigation on the new growth theory. The theory is quite robust and flexible and makes provision for the incorporation of endogenous variables such as trade policies, innovation, technological transfer and learning by doing which are byproducts of trade openness and manufacturing.

Empirical Review

Ogundipe (2022) examined the impact of Nigeria's manufacturing industry on economic growth. Data spanning from 1981 to 2018 were collected and subjected to analysis through the Ordinary Least Squares (OLS) regression approach. The results indicated a notable and constructive relationship between the manufacturing sector's production and the expansion of the gross domestic product.

Emerenini and Ohadinma (2018) investigated the impact of trade liberalization on the manufacturing sector of the Nigerian economy from 1980 to 2016 using the Error Correction Model approach. The result of the study showed that trade openness negatively affected manufacturing output in the short-run while imports exhibited a positive relationship with manufacturing output. The study recommended that Nigeria policymakers should promote strategies that would boost local productions to enhance exports and as well open Nigeria's economy to foreign trade.

Chibuzo(2017) investigated the relationship between trade openness and manufacturing sector growth in Nigeria from 1982 to 2015 using the multiple regression tool technique. Trade openness growth index, investment growth index, production growth index, and exchange growth index were adopted as explanatory variables. The results of the study indicated that only trade openness was statistically significant.

Fongang et al. (2017) employed panel data from 1984 to 2014 to explore the effect of trade openness on manufacturing growth in the Economic and Monetary Community of Central Africa (EMCCA) countries using co-integration and dynamic ordinary least square (OLS) method. The results disclosed that trade openness has an indistinct influence on manufacturing growth. That is, trade openness did not affect manufacturing growth in EMCCA countries. The study suggested that EMCCA countries should develop their manufacturing sector before embracing trade

openness. By this position, it is assumed that the benefits of trade openness are largely determined by the domestic macroeconomic environment of a country.

Agu et al. (2016) studied the impact of globalization on the manufacturing sector in Nigeria, focusing on selected manufacturing firms in Enugu. The study employed a descriptive research design. The population size of the study was 640 with a sample size of 246. The study indicates that trade liberalization negatively affects the consumption of locally made products but has a significant positive effect on employee job relations in the manufacturing Industry. The investigation recommended that the government should put in policies that will check the activities of agents of globalization as it affects the manufacturing sector in Nigeria.

Akpan and Atan (2015) scrutinized the effect of globalization on selected sectors of the Nigerian economy: agriculture, manufacturing, and international trade evidence for the Nigerian economy using annual time series data for the period 1970 to 2011, employing the error correction mechanism approach (ECM). The study found that globalization demonstrated a positive significant impact on the manufacturing sector. The result confirmed that globalization provides Nigeria greater opportunities to improve on its economic performance and the output of the manufacturing sector.

Jonathan et al. (2015) examined the impact of globalization on the manufacturing sector of Nigeria from 1980 to 2013 using the Vector Auto-Regression (VAR) model. The degree of openness, foreign direct investment, exchange rate, and inflation rate were employed to indicate the causal relationship between globalization and manufacturing sector of Nigeria. The study revealed that there is a positive relationship between globalization and the manufacturing sector. The study suggested that the government of Nigeria should encourage openness and step up investment in manufacturing activities by creating investors' friendly environment.

Asongo et al. (2013) studied the influence of trade liberalization on the performance of the manufacturing sector in Nigeria for the period 1989 to 2006 using the Ordinary least square (OLS) techniques. The study certified that there is a positive relationship between manufacturing output, foreign private investment and Gross Domestic Product.

Chen et al. (2013) analyzed the horizontal and vertical export spillovers of foreign direct investment (FDI) on China's manufacturing domestic firms by using firm-level census data over the period 2000 to 2003. The study found that, FDI has a positive impact on export value of domestic firms mainly through backward technology spillovers and a positive impact on the export-to-sales ratio of domestic firms through horizontal export-related information spillovers.

Umoh and Effiong (2013) examined the relationship between trade openness and manufacturing performance in Nigeria using the ARDL bound testing approach to analyze annual data for the period from 1970 to 2008. The study established that there is a positive relationship between trade openness and manufacturing output both in short-run and long-run in Nigeria.

Onakoya et al. (2012) employed the error correction model (ECM) to investigate the effect of trade openness on manufacturing sector performance in the Nigerian economy, using a time-series data from 1975 to 2010. The study manifested that there is a significant and positive relationship between trade openness and the performance of the manufacturing sector. The study Advocated the promotion and development of the Manufacturing sector in Nigeria.

Simbo et al. (2012) studied the performance of the manufacturing sector of Nigeria since independence in 1960 using descriptive statistics. The study found that the manufacturing sector is greatly challenged by the unfavourable business environment, unpredictable power supply, poor and decaying physical infrastructures, multiple taxations, archaic technology, high-interest rates, and inconsistency in government policies.

Oniyide and Ogunjinmi (2021) conducted an analysis on the impact of manufacturing capacity utilization on the economic growth of Nigeria. Utilizing annual data obtained from the World Development Indicators (WDI) and the Central Bank of Nigeria Statistical Bulletin spanning from 1980 to 2018, the study employed the Johansen and Canonical co-integration methodologies, alongside impulse response function to explore the relationship between manufacturing capacity utilization and gross domestic product. Findings from the empirical investigation indicates that manufacturing capacity utilization has an insignificant negative effect on gross domestic product.

Tabi and Ondoa (2010) evaluated the effect of trade openness on the industrialization of the manufacturing sector in Cameroon using the ordinary least squares (OLS) method from 1967 to 2007. The study indicated that there is a wobbling long-term relationship between trade openness and industrialization of the manufacturing sector and that trade openness negatively affects the manufacturing sector of Cameroon and suggested that importations of some food products and inputs cannot be reduced.

EVALUATION OF LITERATURE REVIEWED

After a meticulous literature review, the study observed that there exists no previous study that looked at the joint impact of Trade Openness, Foreign Direct Investment, Foreign Portfolio Investment and Foreign Remittances on the manufacturing sub-sector in one study. Similarly, no empirical study on the impact of foreign remittances and manufacturing sub-sector in Nigeria during the period of investigation. For instance, Chibuzo (2017) investigated the relationship between trade openness and manufacturing sector growth in Nigeria from 1982 to 2015 using the multiple regression technique. Trade openness growth index, investment growth index, production growth index, and exchange growth index were adopted as explanatory variables. Also, Ogundipe (2022) examined the impact of Nigeria's manufacturing industry on economic growth from 1981 to 2018 and adopted gross capital index, formation index, foreign direct investment index, gross domestic product index and manufacturing output index as cardinal variables for the study.

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METHODOLOGY OF STUDY

The study adopted the ex-post facto research design which is a component of the quasi-experimental research design. The study employed both descriptive and econometric approaches. The descriptive approach looked at the trends and other properties of the variables while the econometric approach involves unit root test (Augmented Dickey-Fuller, ADF), co-integration Test (Bound Test Co-integration), Auto-Regressive Distributed Lag (ARDL) and some diagnostic tests (normality and Parameter Stability) were conducted on the variables from 1981 to 2020.

Model specification

MAN = f(TPN, FDI, FPI, RMT, EXR) (1)

Where;

MAN = Manufacturing Industry Output
TPN = Trade Openness
FDI= Foreign Direct Investment
FPI= Foreign Portfolio Investment
RMT= Foreign Remittances
EXR = Exchange Rate

The explicit econometric forms of equations (1) is stated as follows:

$MAN = \alpha0 + \alpha1TPN + \alpha2\ FDI + \alpha3\ FPI + \alpha4\ RMT + \alpha5EXR + \mu t$ (2)

$\alpha0$ = Intercept
$\alpha1$- $\alpha5$= Coefficients and
μ = Error term

MAN, TPN, FDI, FPI, RMT and EXR as earlier defined.

On a priori:

$\alpha1>0$, $\alpha2>0$, $\alpha3>0$ $\alpha\ 4>0$ and $\beta5<0$

Thus,

$\frac{\partial MAN}{\partial TPN}>0$, $\frac{\partial MAN}{\partial \mathrm{FDI}}>0$, $\frac{\partial MAN}{\partial \mathrm{FPI}}>0$, $\frac{\partial MAN}{\partial \mathrm{FPI}}>0$, $\frac{\partial MAN}{\partial \mathrm{RMT}}>0$ and $\frac{\partial MAN}{\partial \mathrm{EXR}}<0$

RESULTS AND DISCUSSION

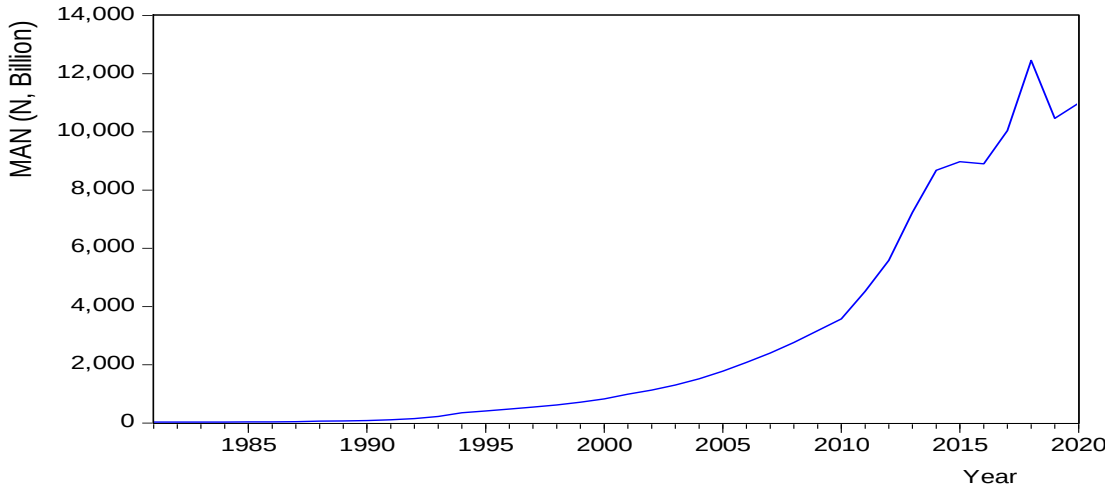
The analyses of the study were carried out in phases. First, the descriptive statistics ascertained the trends and other properties of the variables incorporated into the study. Secondly, the econometric approach which included the unit root test (Augmented Dickey-Fuller, ADF) test, co-integration Test (Bound Test Co-integration), Auto-Regressive Distributed Lag (ARDL) and some diagnostic tests (normality and Parameter Stability).

Descriptive Statistics

The trend in manufacturing as revealed in the figure below showed that the manufacturing sub-sector had a positive but lethargic growth rate between 1981 and 1983. However, MAN took a

noise-dive in 1984 with a negative growth of about -4 billion in 1984. However, its value recovered in 1985 and continued to enjoy an upswing to 2010; in absolute term, the value MAN increased by 4,157.98 billion naira representing about 92% from 4527.45 billion naira in 2011. There was a sluggish increase in the value of MAN to about 8,903.24 billion naira in 2016 from which it accelerated speedily towards the climax in 2018 to about 40% which was the uppermost point of the variables but tails pined to 10,989.25 billion naira in 2020.

Figure 1: Trend of Manufacturing (MAN)



Source: *Author's Computation using E-views 9*

Table 1: *Descriptive Statistics*

	MAN	*TPN*	*FDI*	*FPI*	*RMT*	*EXR*
Mean	2836.791	32.02935	1.533238	-436.3492	2.670083	98.83096
Median	907.5699	33.38961	1.129237	-3.483000	1.645826	106.4643
Maximum	12455.53	53.27796	5.790847	403.3410	8.311897	306.0837
Minimum	26.88596	9.135846	0.257422	-3840.685	0.004883	0.617708
Std. Dev.	3776.690	12.28184	1.222741	972.1558	2.600845	96.26770
Skewness	1.272137	-0.305390	1.781342	-2.184833	0.491286	0.746820
Kurtosis	3.158324	2.250473	6.240151	6.571982	1.791111	2.600477
Jarque-Bera	10.83066	1.558073	38.65217	53.08838	4.044771	3.984294
Probability	0.004448	0.458848	0.000000	0.000000	0.132339	0.136402
Sum	113471.6	1281.174	61.32953	-17453.97	106.8033	3953.239
Sum Sq. Dev.	5.56E+08	5882.905	58.30873	36858387	263.8114	361431.3
Observation	40	40	40	40	40	40

Source: *Author's Computation using E-views 9*

Table 1 above shows the mean values of manufacturing MAN, TPN, FDI, FPI, RMT and EXR to be 3100.367, 2421.438, 33.34544, 32.25799, 1.571703, -322.2862, 2.508384 and 88.54404 respectively. The middle values of the variables are 818.7655, 769.9235, 8.398612, 33.95119, 1.266578, -1.814500, 1.600557 and 97.01772 correspondingly. Similarly, the maximum and minimum for PNG, MAN, SLM, TPN, FDI, FPI, RMT and EXR are presented thus; 13449.59, 12455.53, 224.7905, 53.27796, 5.790847, 403.3410, 8.311897 and 306.0837: 4.280034, 26.88596, 3.715748, 9.135846, 0.257422, -3840.685, 0.004883 and 0.617708 respectively. Also, the standard deviation calculated for petroleum and natural gas (PNG) was the most volatile in the series with a value of about 4069.664 while foreign direct investment (FDI) was the least volatile variable with a value of about 1.2432.

The calculated values for the skewness statistics for Petroleum and natural gas (PNG), manufacturing (MAN), Solid mineral (SLM), remittances (RMT) and exchange Rate (EXR) were positively skewed because their values are greater zero suggesting that their distributions have a long right tail. Though, exchange Rate (EXR) reflects a normal distribution that is symmetric around zero (0.802969) while Trade openness (TPN) and (FPI) are negatively skewned because their values are less than zero indicating their distributions have long left tail. That is, more lower values below the sample average since -0.353563 and -2.887760 is less than zero.

Again, the kurtosis statistics of Petroleum and natural gas (PNG) is mesokurtic depicting a normal distribution. However. MAN, SLM, FDI and FPI respectively are leptokurtic That is, the distributions has a positive kurtosis values, they have peaked curves indicating higher values away from their sample average since their values are greater than 3 while TPN, RMT and EXR variables were platykurtic, meaning that their distributions were flat relative to normal distribution.

The Jarque-Bera statistics and probability value at 5 percent significant level portrayed that the variables are not a normally distributed. Based on these observations, it therefore means that there is unit root (non-stationarity) in the series. Thus, estimating these variables at level might not give good results, hence, the need to conduct the unit root test. The unit root test is conducted to test whether or not the variables were stationary. The study adopts the Augmented Dickey Fuller (ADF) unit root tests procedures.

Unit Root Test.

Table 2: ADF Result

Variable	*ADF at Level*	*ADF at 1st Difference*	*Status*	*Remark*
MAN	--0.622510	-4.582117	I(1)	Stationary
TPN	-2.276833	-7.347059	I(1)	Stationary
FDI	-3.895169	-	I(0)	Stationary
FPI	-3.418566	-	I(0)	Stationary
RMT	-1.404193	-6.282245	I(1)	Stationary
EXR	1.736109	-4.212040	I(1)	Stationary
Critical Values				
1% level	-3.621023	-3.632900		
5% level	-2.943427	-2.948404		
10% level	-2.610263	-2.612874		

Source: ***Author's Computation using E-views 9***

The results of the unit root test in Table 2 above revealed that FDI and FPI variables were stationary at level while MAN, TPN, RMT, and EXR were stationary at 1st difference. Therefore, the study concludes that the independent variables were integrated of both order zero and one, that is I(0) and I(1), and the dependent variable is integrated of order one, that is, I(1). Since the ADF results indicate that the series are of different orders of integration the study adopts the Bounds co-integration test. See Giles (1975), Perasan, Shin, and Smith (2001), Jawaid and Waheed (2016) and Salisu (2016), for different orders of co-integration.

Table 3: ARDL Bound Test Co-integration Result

F-Statistics	**5.325813**	
% Critical Levels	Critical Value for Bond Test	
Significance	1(0) Bond	1(1) Bond
10%	2.26	3.35
5%	2.62	3.79
2.5%	3.96	4.18
1%	3.41	4.68

Source: *Author's Computation using E-views 9*

From the result above, the calculated f-statistic value of 5.325813 the theoretical critical value for the lower bound I(0) at 5 percent level. This means that there is co-integration, hence, there is long run relationship between MAN, TPN, FDI, FPI, RMT and EXR in Nigeria within the period under review. Thus, short run and long run are estimated following the ARDL approach.

Table 4: *ARDL Long Run Estimation Result for Manufacturing Industry model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TPN	0.054709	0.011582	4.723665	0.0002
FDI	0.514291	0.245805	2.092269	0.0509
FPI	-0.001402	0.000500	-2.801767	0.0118
RMT	0.211714	0.061951	3.417469	0.0031
EXR	0.000816	0.005232	0.156038	0.8777
C	4.371454	0.588330	7.430277	0.0000

Source: Author's Computation using E-views 9

Long Run Estimation Results for Manufacturing Industry Model Based on ARDL

The long run coefficient of TPN has positive relationship with MAN which economically infers that more openness will attract new and advanced production technologies and widen the market for manufactured products in the long run. The positive coefficient and statistically significant impact of FDI economically indicates that, as foreign investors move their technology, capital, materials and managerial resources into the domestic manufacturing space, the productivity of the sub-sector will be triggered in the long run. FPI exhibited negative relationship with MAN, economically connotes that foreign portfolio 'investment will not enhance the productivity of the manufacturing subsector in the long run. This may be attributed to inadequate regulation of the financial market, insecurity, corruption, and political instability. The long run analysis of the coefficient of RMT is positive and statistically significant, suggesting that, more foreign remittances inflow channeled into the sector will boost its productivity in the long run. EXR as the check variable has positive and statistically significant impact on MAN which is indicative of over dependent on imported factors in operation of the subsector.

Table 5: *ARDL Short Run Estimation Result for Manufacturing Industry model*

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
DLOG(MAN(-1))	-0.303867	0.118626	-2.561548	0.0196
DLOG(MAN(-2))	-0.067811	0.108297	-0.626163	0.5391
DLOG(MAN(-3))	0.483753	0.102419	4.723289	0.0002
D(TPN)	-0.001619	0.001249	-1.296195	0.2113
D(TPN(-1))	0.000785	0.001746	0.449758	0.6583
D(TPN(-2))	-0.006561	0.001667	-3.934467	0.0010
D(FDI)	0.055538	0.012364	4.491831	0.0003
D(FPI)	-0.000061	0.000024	-2.577092	0.0190
D(RMT)	0.004302	0.008922	0.482249	0.6354
D(RMT(-1))	-0.016755	0.008872	-1.888381	0.0752
D(EXR)	0.000088	0.000590	0.149343	0.8829
ECM (-1)	-0.107990	0.035753	-3.020432	0.0074
R2 = 0.694; Adj-R2 = 0.4403; F-stat. = 4.7308; DW = 1.769				

Source: Author's Computation using E-views 9

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Short Run Estimation Results for Manufacturing Industry Model Based on ARDL

The regression results of the short run dynamics based on the ARDL in Table 5 above shows that the calculated Adj-R^2 = 0.4403. This means that about 44 per cent of the total variations in MAN are accounted for by the explanatory variables TPN, FDI, FPI, RMT and EXR. Thus, the remaining 66 per cent of variations is caused by exogenous factors to the model. This observation is further boosted by the adjusted R^2 of about 44 per cent. Also, the f-statistic calculated of 4.7308 is greater than $F_{0.05,V1,V2}$ of 2.42. This means that the overall model is significant at 5 per cent level. The value of the Durbin Watson (D.W) is 1.769, suggesting that there is the absence of serial autocorrelation in the model. The result of the analysis reveals that the coefficient of trade Openness(TPN) is negative in both the short run and long run. In the short run, TPN is -0.0001612. This implies that a unit increase in trade Openness(TPN) will decrease manufacturing (MAN) by about 0.16 percent in Nigeria. The negative sign of Trade Openness(TPN) did not conform to a priori expectation.

The coefficient of trade Openness(TPN) is not statistically significant at 5 percent level. This is because the t-calculated of 1.296195 (in absolute terms) is less than the t-table value of 2.042. Hence, the study accepts the null hypothesis that there is no significant relationship between trade Openness (TPN) and the manufacturing sub-sector in Nigeria within the period under review.

The result of the short-run analysis reveals that the coefficient of foreign direct investment (FDI) is 0.055538; implying that a unit increase in foreign direct investment (FDI) will increase the manufacturing sub-sector by about 5.55 percent in Nigeria. The positive sign of the manufacturing sub-sector conforms to apriori expectation that an increase in foreign direct investment (FDI) will increase manufacturing sub-sector index (MAN). The coefficient of foreign direct investment (FDI) is statistically significant with manufacturing (MAN) at 5 percent level. This is because the t-calculated of 4.491831 is greater than the t-table value of 2.042. Therefore, the study rejects the null hypothesis that there is no significant relationship between foreign direct investment (FDI) and manufacturing (MAN) in Nigeria within the period under review.

The result of the analysis further reveals that, the coefficient of foreign portfolio investment (FPI) is negative in both the short and long run. In the long run, FPI is -0.000061. This implies that a unit increase in foreign portfolio investment (FPI) will decrease manufacturing (MAN) by about 0.006 percent in Nigeria. The negative sign of foreign portfolio investment (FPI) does not conform to our a priori expectation in line with economic theory. The coefficient of foreign portfolio investment (FPI) is statistically significant at 5 percent level. This is because the t-calculated of 2.577092 (in absolute terms) is greater than the t-table value of 2.042. Hence, the study, therefore, rejects the null hypothesis that there is no significant relationship between foreign portfolio investment (FPI) and the manufacturing industry in Nigeria within the period under review. The short-run result reveals that the coefficient of remittance (RMT) is 0.004302. This implies that a unit increase in remittance (RMT) will increase manufacturing (MAN) by about 0.43 percent in Nigeria. The positive sign of remittance (RMT) conforms to our a priori expectation in line with economic theory. The coefficient of remittance (RMT) is statistically significant with

manufacturing (MAN) at a 5 percent level. Since the t-calculated of 0.482249 is less than the t-table value of 2.042. Hence, the study accepts the null hypothesis that there is no significant relationship between remittance (RMT) and manufacturing (MAN) in Nigeria. The result of the analysis reveals that the coefficient of exchange rate (EXR) is 0.000088; implying that a unit increase in exchange rate (EXR) increases the manufacturing industry by about 0.008 percent in Nigeria. The positive sign of exchange rate (EXR) does not conform to our a priori expectation that decrease in the exchange rate (EXR) will increase the manufacturing industry. The coefficient of the exchange rate as the check variable is not statistically significant at 5 percent level. This is because the t-calculated of 0.149343 is less than the t-table value of 2.042. Hence, the study, therefore, accepts the null hypothesis that there is no significant relationship between exchange rate and manufacturing in Nigeria within the period under review. Exchange rate (EXR) as a check variable has positive coefficient and not statistically significant in the period under review.

Diagnostic Testing

The study also conducted some diagnostic tests to ascertain whether or not the series are free from linearity (Ramsey Reset Test), autocorrelation (Breusch-Godfrey Serial Correlation LM Test), heteroscedasticity (Breusch-Pegan-Godfrey Test). See table below for result of the diagnostic test results.

Table 6 : *Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results*

	F-Statistic	t-Statistic	Obs*R-Square	Prob. Value
Ramsey Reset Test	1.551046	1.245410	-	0.2299
Breusch-Godfrey Serial Correlation LM Test	0.052862	-	0.105396	0.8209
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.448181	-	18.59320	0.2252

Source: *Author's Computation using E-views 9*

From Table 6 above, the results of the diagnostic test show that the linearity test using Ramsey reset test indicates that the f-statistic (1.551046) and t-statistic (0.052862) with a computed p-value of 0.2299 which is greater than 5 percent (0.05) critical value rejects the null hypothesis and concludes that the model is correctly specified.

The result of the serial or autocorrelation test using the Breusch-Godfrey Serial Correlation LM Test shows that the f-statistic is 0.052862, observed *R is 0.105396, Chi-Square probability value is 0.8209. This indicates that the probability value of about 82 percent (0.8209) is greater than 5 percent (0.05) critical value; hence we confirm no serial correlation in the model.

The result of the heteroscedasticity test using the Breusch-Pegan-Godfrey test shows that the f-statistic is 1.448181, Obs*R2 is 18.59320, while the Chi-Square probability value of 0.2252. The

result suggests that there is no evidence of heteroskedasticity in the model since the probability Chi-square value is more than 5 percent (P >0.05). So, residuals do have constant variance which is desirable in regression meaning that residuals are Homoscedastic.

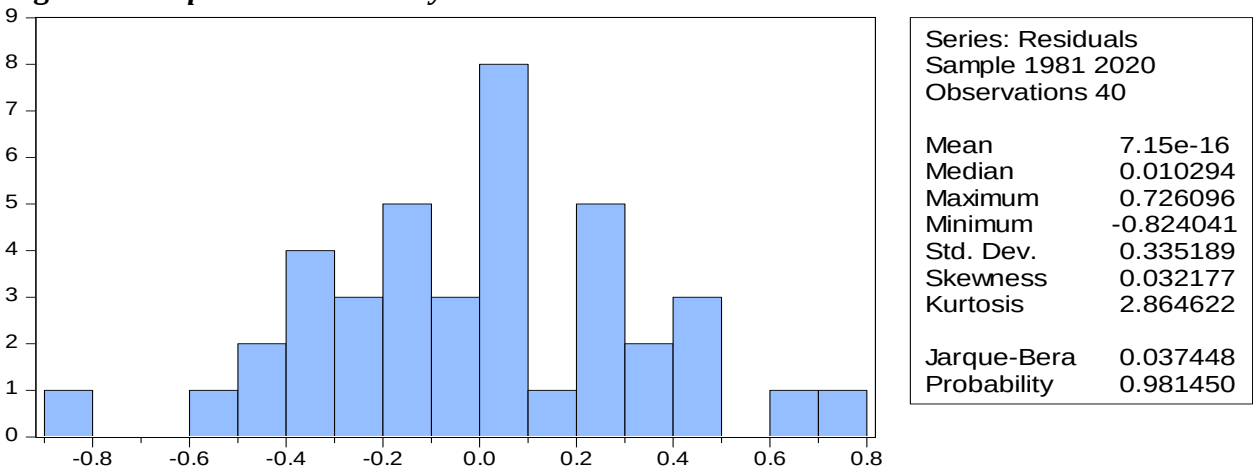
Normality Test

Here we present a histogram and descriptive statistics of the residuals, including the Jarque-Bera statistic for testing normality. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic should not be significant.

Jarque-Berais a test statistic for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. If the computed p-value is greater than 0.05 significant levels, then we do not reject the null hypothesis and conclude that residuals are normally distributed. Conversely, if the computed p-value is less than 0.05 significant levels, then we reject the null hypothesis and conclude that residuals are not normality distributed.

The result of the normality test using Jarque-Bera test is presented in figure 2 below. The result revealed that the Jarque-Bera test for normality of the model shows a probability value of about 80 percent (0.795681) which is higher than 5 percent (0.05), therefore the model is normally distributed.

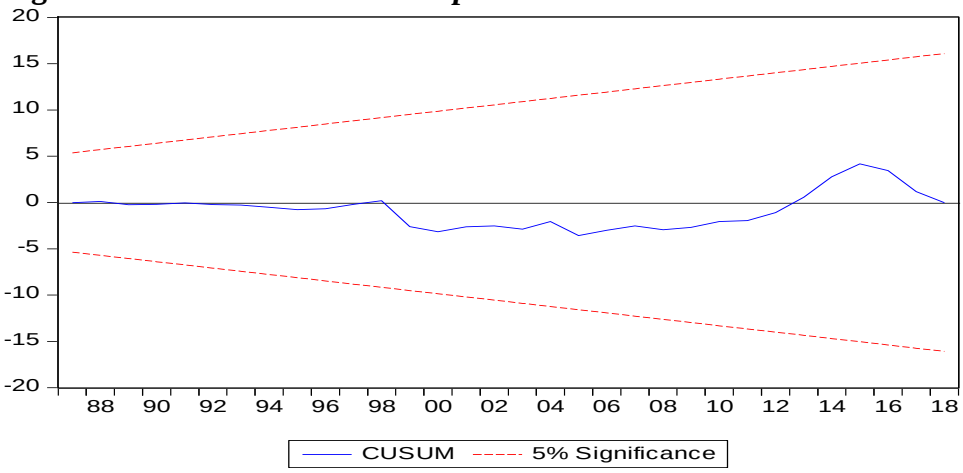
Figure 2: ***Jarque-Bera Normality Test***



Parameter Stability Test

The stability of the parameters in the short-run manufacturing (MAN) model is examined using the plots of the cumulative sum of recursive residuals (CUSUM) as advocated by Adebiyi and Dauda (2004). Instability of the parameters arises due to structural changes and the institution of different policy regimes over the sample period. The CUSUM test is particularly useful for detecting systematic changes in the regression coefficients. If any of the straight lines in the graph is crossed, the null hypothesis that the regression equation is correctly specified is rejected at 5 percent level of significance. From figures 4.14, the CUSUM stays within the 5 percent critical line, indicating parameter constancy throughout the sample period in this study.

Figure 3: ***CUSUM Residuals Graph***



CONCLUSION AND RECOMMENDATIONS

The study examined trade openness and manufacturing sub-sector in Nigeria from 1981 to 2020. Annual time series data on manufacture sub-sector, trade openness, foreign direct investment, Foreign Portfolio Investment, foreign remittances and exchange rate were collected from secondary sources and analyzed using both descriptive and econometrics techniques (Auto-Regressive Distributed Lag (ARDL) method). The study concluded that trade openness and manufacturing sub-sector fostered growth in Nigeria. Foreign direct investment promoted the performance of the manufacturing sub-sector of the Nigerian economy. Foreign portfolio investment portrayed subtractive influence on the performance of the manufacturing sub-sector in Nigeria during the period of study. Based on these findings, the investigation recommends that government of Nigeria should implement the policy of duty draw back/suspension scheme (DDBS) which stipulated the refund of import duties on raw materials including packaging materials used in manufacturing exportable goods and provide incentives such as subsidized loan and transitory tax exemption to encourage both indigenous and foreign investors to participate more in the manufacturing industry.

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